

ANALYSIS

September 2019

Prepared by

Mark Zandi
Mark.Zandi@moodys.com
Chief Economist

Contact Us

Email
help@economy.com

U.S./Canada
+1.866.275.3266

EMEA
+44.20.7772.5454 (London)
+420.224.222.929 (Prague)

Asia/Pacific
+852.3551.3077

All Others
+1.610.235.5299

Web
www.economy.com
www.moodyanalytics.com

Evaluating Senator Warren's Social Security Reform Plan

Introduction

Democratic presidential candidate Senator Elizabeth Warren has unveiled a plan to significantly overhaul the nation's Social Security system. Without changes to the system, the Social Security Administration's actuaries project that the trust fund underpinning the system will be insolvent by 2035. Under current law, once insolvent, benefits must be reduced to equal the revenue financing the system. It is unlikely that future lawmakers would allow this to happen, but the system's precarious financial status is a source of significant angst for many Americans.

Evaluating Senator Warren's Social Security Reform Plan

BY MARK ZANDI

Democratic presidential candidate Senator Elizabeth Warren has unveiled a plan to significantly overhaul the nation's Social Security system. Without changes to the system, the Social Security Administration's actuaries project that the trust fund underpinning the system will be insolvent by 2035. Under current law, once insolvent, benefits must be reduced to equal the revenue financing the system. It is unlikely that future lawmakers would allow this to happen, but the system's precarious financial status is a source of significant angst for many Americans.

Senator Warren's reform plan addresses Social Security's financial challenges while also substantially increasing benefits. Her plan does this by increasing revenues by more than the increase in benefits through higher payroll and investment income taxes paid by high-income households. Under the plan, the Social Security trust fund remains solvent until 2054—nearly 20 years more than is currently projected. The net macroeconomic impacts of the reform are small but positive in the long run; the economic benefit of smaller federal government deficits and debt load is largely offset as high-income people reduce their own work hours. The plan results in a much more progressive Social Security system, as high-income people shoulder the financial burden of the plan, while low- and middle-income people benefit substantially.

This brief paper outlines Senator Warren's reform plan and evaluates its actuarial, macroeconomic and distributional impacts.

Warren reform plan

Benefit enhancements are significant under Senator Warren's Social Security reform plan. It will:

- » Increase average monthly benefits by \$200 for all Social Security beneficiaries.

Assuming the plan is implemented beginning in 2020, the monthly benefit for the typical beneficiary that year would increase from \$1,395 to \$1,595.

- » Increase average monthly benefits by \$200 for all recipients of Supplemental Security Income who are over the current federal retirement age and who do not receive the Social Security monthly benefit increase. This will benefit close to [1.1 million individuals](#).
- » Repeal the [Windfall Elimination Provision](#) and [Government Pension Offset](#) for current and future Social Security beneficiaries. The WEP is an adjustment to Social Security benefits for those who receive non-covered pensions and qualify for Social Security benefits based on other Social Security-covered earnings. A non-covered pension is a pension paid by an employer that does not withhold Social Security taxes. Typically, they are state and local governments or non-U.S. employers. The WEP applies to nearly 1.9 million beneficiaries. The Government Pension Offset may apply if a person receives a pension from a government job in which no Social Security taxes are paid. In this case, some or all of that per-

son's Social Security spouse's, widow's, or widower's benefit may be offset due to receipt of that pension.

- » Close the benefits gap between dual-earner and single-earner survivors. A non-earning spouse in a single-earner household currently receives 100% in survivor benefits after the earning spouse has died. In dual-earner households, however, the surviving spouse must elect either the benefits from their own earnings at 100% or the spouse's benefits at 100%. This gap is closed by increasing the survivor benefits in dual-earner households to 75% of the total combined household benefits, capped at the benefit for a worker with average career earnings, or 100% of their own or their spouse's benefits, whichever is greater.
- » Extend Social Security benefits to full-time students over the age of 19 until the age of 24 for those whose parent is disabled or has died. This restores the provision that was in place until 1983 and extends coverage by two additional years, from age 22 to 24.
- » Eliminate the minimum age requirement for widows and widowers with disabilities, so that they can receive 100% survivor

benefits. Current law has an age minimum of 50, at which point widows and widowers can claim highly reduced benefits. This change would permit widows and widowers with disabilities to receive full benefits when a spouse dies regardless of age.

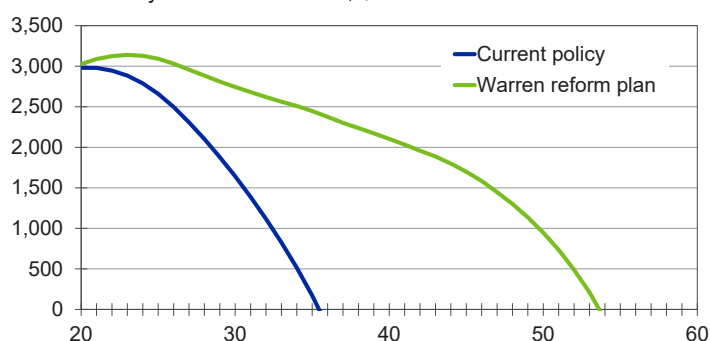
- » Provide a caregiver credit for caregivers of children under the age of 6, disabled family members, or the elderly, for any month away from or declined participation in the labor market. A credit would be provided for each month of caregiving, for individuals providing at least 80 hours of care a month, so that total earnings for the year are equal to 100% of that year's median annual wage for individuals who earned less than 100% of the median annual wage during the time of caregiving. The credit is provided to current beneficiaries retroactively by five years and to future beneficiaries.
 - » Provide a job training credit to individuals participating in a job training or an apprenticeship program. These beneficiaries could elect to have their income during these job training or apprenticeship years disregarded (and those years dropped from the 35 years used to calculate average earnings) for calculating their average indexed monthly earnings.
 - » Increase the [Special Minimum Benefit](#) to 125% of the Federal Poverty Level. The special minimum benefit is a benefit amount enacted in 1972 to provide adequate benefits to long-term low earners. The eligibility requirement for this benefit is also changed so that a year of coverage is achieved through four qualifying credits in a year.
 - » Use the increase in the [Consumer Price Index for the Elderly](#), or CPI-E, rather than the increase in the Consumer Price Index for Urban Wage Earners and Clerical Workers, or CPI-W, to calculate the cost-of-living adjustment. This change would increase the cost-of-living adjustment for Social Security benefits by an estimated average of close to 0.2 percentage point per year.
- Senator Warren's plan also includes significant changes to the sources of revenue

used to finance the Social Security system. It will:

- » Apply a 14.8% payroll tax on annual earnings of over \$250,000. Under current law, only earnings up to a specified maximum, which is \$132,900 in 2019, are subject to a 12.4% payroll tax. Under the Warren reform plan, the taxable maximum would continue to grow with average wages, but the \$250,000 threshold would not change, so the gap between the two would shrink. The taxable maximum is expected to exceed \$250,000 by 2037. After that, all earnings from jobs covered by Social Security would be subject to the payroll tax. Below the taxable maximum, the payroll tax would remain at 12.4%. The current-law taxable maximum would still be used for calculating benefits, so scheduled benefits would not change under this alternative.
- » Apply a separate 14.8% tax on investment income as defined in the Affordable Care Act's Net Investment Income Tax, with unindexed thresholds equal to \$250,000 for a single filer and \$400,000 for married joint filers.
- » Broaden the investment income tax base to include gross income and gains from any trades or businesses of an individual not otherwise subject to the payroll tax. This would modify the current definition of net investment income to include the distributions received by active S corporation shareholders, active limited partners, and active LLC members, and the proceeds from the sale of business property by non-trading active business partners.
- » Apply the payroll tax to pass-through business owners under the Self-Employment Contributions Act. This would close

Chart 1:
Warren Plan Extends Trust Fund's Solvency

Social Security trust fund balance, \$ bil



Source: Moody's Analytics

the so-called Gingrich-Edwards SECA tax loophole and would apply to all chapter S corporations.

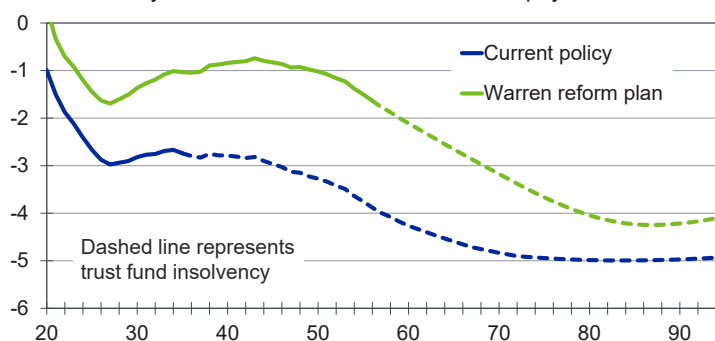
Actuarial impact of the Warren plan

Senator Warren's Social Security reform plan puts the Social Security system on much sounder financial ground. If the plan were fully implemented at the start of 2020, the trust fund would remain solvent until 2054, nearly 20 years longer than under current policy (see Chart 1). Moreover, the system is in substantially better financial shape throughout the 75-year actuarial horizon of the system (see Chart 2).

Table 1 shows the impact of each of the benefit and revenue changes in Senator Warren's reform plan on the system's finances based on the dynamic actuarial present-value balance ratio. This accounting measure is equal to the ratio of the sum of the value of the trust fund and the present value of projected revenues less payments over the 75-year actuarial horizon to the present value of taxable earnings. It is dynamic since it uses the [Moody's Analytics model](#) of the U.S. and global economies to account for both behavioral and macroeconomic changes that result from the benefit and revenue changes in the reform plan. For example, the estimates account for the fact that higher payroll taxes under the reform plan create an incentive for employers and employees to change the composition of compensation, shifting from taxable compensation to forms of nontaxable compensation.

Chart 2: Trust Fund Is Put on Firmer Financial Ground

Social Security income less cost as a % of taxable payroll



Source: Moody's Analytics

Under current policy, the Social Security system's dynamic actuarial present value balance over the 75-year horizon is projected to be -3.3% of the present value of taxable earnings. This compares with a -2.8% intermediate static balance projection made by Social Security's actuaries in their [2019](#)

annual report. The difference is due at least in part to the saving and labor supply responses of households to changes in policy, and the impact of changes in federal government deficits and debt on investment and capital formation. The costliest changes to benefits in the reform plan are the immediate \$200 increase in monthly benefits, the adoption of the Consumer Price Index for the Elderly to index benefit increases, and the repeal of the Windfall Elimination Provision and Government Pension Offset. The other benefit changes are significantly less costly. Far and

away, the largest revenue increases come from subjecting earnings above \$250,000 to a 14.8% payroll tax, and taxing investment income of individuals with earnings above \$250,000 at the same 14.8% rate.

After accounting for the reform's benefit and revenue changes, the Social Security system's dynamic actuarial present value balance over the 75-year horizon narrows to -2.1%. More reforms will eventually be required to shore up the system's finances, but Senator Warren's plan goes a long way to addressing the system's financial shortfall.

From the perspective of the federal government's 10-year budget horizon, Senator Warren's reform plan would reduce the nation's deficits by more than \$1.1 trillion cumulatively over the 2020-2029 period.

The macroeconomic impacts of Senator Warren's reform plan are small, but ultimately positive. The most immediate impact is to reduce real GDP growth in 2020, the year the plan is assumed to be implemented, by close to 0.2 percentage point. However, the reduction in GDP is smaller than that implied by the increase in payroll and investment income taxes, which is almost \$100 billion more than the increase in Social Security benefits, equal to almost 0.5% of GDP.

While high-income households, who pay the increased taxes, turn more cautious in their spending, they can use their savings to offset the impact of much of the tax increase. At the same time, low- and middle-income households, who enjoy the increased retirement and disability benefits, quickly spend the bulk of those benefits.

Real GDP growth is ultimately lifted by the increase in national saving under the plan. The federal government's budget deficits and debt load are meaningfully smaller, and high-income households who shoulder the financial burden of the plan also eventually save more. The resulting increase in national saving reduces long-term interest rates, prompting more investment, which results in more capital formation and stronger productivity growth. This macroeconomic benefit takes several decades to be meaning-

Macroeconomic impact of the Warren plan

Real GDP growth is ultimately lifted by the increase in national saving under the plan. The federal government's budget deficits and debt load are meaningfully smaller, and high-income households who shoulder the financial burden of the plan also eventually save more. The resulting increase in national saving reduces long-term interest rates, prompting more investment, which results in more capital formation and stronger productivity growth. This macroeconomic benefit takes several decades to be meaning-

Table 1: Social Security (OASDI) Actuarial Balance Ratio

Dynamic long-run (2020-2094) actuarial PV balance as a % of PV of taxable earnings

Current policy	-3.31
Change in actuarial balance due to reform plan provision:	
\$200 Increase In Monthly Social Security Benefits	-0.83
Adoption of CPI-E	-0.57
Repeal Windfall Elimination Provision & Govt Pension Offset	-0.40
Special Minimum Benefit to 125% of Poverty Level	-0.26
Close Dual-Earner, Single-Earner Gap	-0.16
Student Benefits to Age 24 For Dead/Disabled Beneficiaries	-0.10
SSI Benefits for Beneficiaries Over Current FRA	-0.06
Eliminate Age Minimum for Widows with Disabilities	-0.05
Caregiver Credit	-0.03
Job Training Credit	-0.03
Subject Earnings Greater Than \$250k to 14.8% Payroll Tax	2.29
Investment Income Tax (14.8% with \$250K/400K thresholds)	1.46
Broaden Investment Tax Base	0.22
Tax Pass-Through Business Owners Under SECA	0.07
Warren reform plan	-2.09

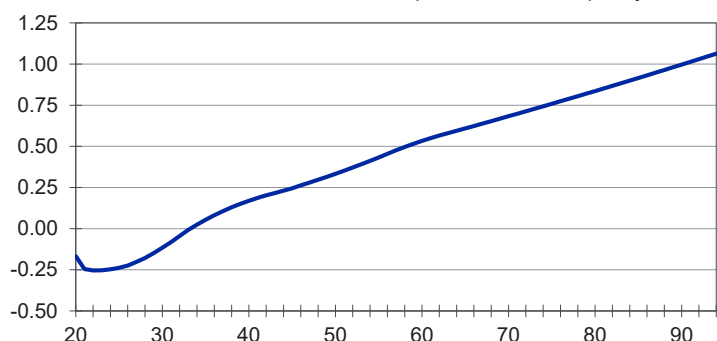
Note:

The changes in actuarial balances for the individual provisions do not add up to the total, as the individual estimates do not include the interaction effects among the provisions.

Source: Moody's Analytics

Chart 3: Macroeconomic Impacts of Reform Are Small

% difference in real GDP under Warren plan and current policy



Source: Moody's Analytics

ful, but by the end of the 75-year actuarial horizon, real GDP is just over 1 percentage point higher because of the reform plan than it would have been otherwise (see Chart 3).

Offsetting the benefit of the plan on GDP to some extent is the negative impact on the supply of labor. The lower after-tax earnings of high-income households for each additional hour worked make other uses of time relatively more attractive, so these households work fewer hours, which lowers real GDP.

Distributional impact of the Warren plan

Senator Warren's plan to reform the Social Security system would make the system substantially more progressive than it is today. That is, it would substantially increase the tax burden on people with high incomes, and while everyone would receive more retirement benefits, the increase would be much more important for the finances of low- and middle-income households.

The increase in benefits under the plan would immediately lift an estimated 4.9 million elderly people out of poverty under the supplemental poverty measure. And for those in the bottom half of the income distribution, the plan increases average Social Security benefits by nearly 25%. Benefits for those in the top 10% of the distribution increase by less than 5%.

tribution have an estimated effective payroll tax rate of about 2%, compared with over 10% for those in the middle 50% of the distribution, and 8% in the bottom 40% of the distribution. Making more earnings taxable at the higher rate envisaged in the Warren plan goes a long way toward leveling the payroll tax rate faced by these high earners. Those in the top 1% of the earnings distribution would see their annual payroll taxes increase by approximately \$150,000, while those in the next 1% of the distribution would pay just over \$10,000 more annually in taxes.

Some caveats

Given the complexity and scope of Senator Warren's Social Security reform plan, there is a substantial amount of uncertainty regarding its actuarial, macroeconomic and distributional impacts, especially over the 75-year horizon. This evaluation relies heavily on previous analysis done by the Social Security actuaries and the Congressional Budget Office, since many of the provisions in the senator's plan have been previously proposed and analyzed. Accounting for the potential interactions between the various benefit and revenue changes and people's behavioral responses to the changes is challenging.

Going to the reform plan itself, it weakens the link between the amount of taxes that

People with earnings above the maximum taxable earnings currently pay a smaller percentage of their total earnings in payroll taxes than do people whose total earnings are below the maximum. For example, those in the top 1% of the earnings dis-

tribution pay into the system and the benefits they receive. Historically, that link has been an aspect of Social Security considered important to its widespread popularity and political insulation. Calling upon high-earning people to pay substantially more into the system than they receive in benefits, as the senator's reform plan envisages, could hurt its political appeal.

It is also important to consider that Senator Warren has put forth a number of other economic policy plans, including for affordable housing, student lending, clean energy and childcare, that are also financed in large part by substantially greater taxes on high-income and high net worth households. Given this financial burden, there could be significant behavioral changes by these households that are difficult to gauge.

Conclusions

The Social Security system is in desperate need of reform. If policymakers do nothing, the system will become insolvent in about 15 years, which, under current law, will result in significant cuts in Social Security benefits. For financially precarious low- and middle-income Americans, this is an especially scary possibility.

Senator Warren has put forward a thoughtful and comprehensive plan involving a range of changes to benefits and revenues to reform the Social Security system. The reforms put the system on much sounder financial ground, extending its solvency by almost 20 years into the middle of this century. More reforms will eventually be needed, but the plan goes a long way toward addressing the system's financial problems. There are significant macroeconomic cross-currents as a result of the plan, but the net impact is a small positive. The distributional impacts are much more substantive, with high-income earners shouldering the financial burden of the plan and low- and middle-income people enjoying increased benefits. The plan results in a much more progressive Social Security system.

About the Author

Mark Zandi is chief economist of Moody's Analytics, where he directs economic research. Moody's Analytics, a subsidiary of Moody's Corp., is a leading provider of economic research, data and analytical tools. Dr. Zandi is a cofounder of Economy.com, which Moody's purchased in 2005.

Dr. Zandi's broad research interests encompass macroeconomics, financial markets and public policy. His recent research has focused on mortgage finance reform and the determinants of mortgage foreclosure and personal bankruptcy. He has analyzed the economic impact of various tax and government spending policies and assessed the appropriate monetary policy response to bubbles in asset markets.

A trusted adviser to policymakers and an influential source of economic analysis for businesses, journalists and the public, Dr. Zandi frequently testifies before Congress on topics including the economic outlook, the nation's daunting fiscal challenges, the merits of fiscal stimulus, financial regulatory reform, and foreclosure mitigation.

Dr. Zandi conducts regular briefings on the economy for corporate boards, trade associations and policymakers at all levels. He is on the board of directors of MGIC, the nation's largest private mortgage insurance company, and The Reinvestment Fund, a large CDFI that makes investments in disadvantaged neighborhoods. He is often quoted in national and global publications and interviewed by major news media outlets, and is a frequent guest on CNBC, NPR, Meet the Press, CNN, and various other national networks and news programs.

Dr. Zandi is the author of *Paying the Price: Ending the Great Recession and Beginning a New American Century*, which provides an assessment of the monetary and fiscal policy response to the Great Recession. His other book, *Financial Shock: A 360° Look at the Subprime Mortgage Implosion, and How to Avoid the Next Financial Crisis*, is described by the New York Times as the "clearest guide" to the financial crisis.

Dr. Zandi earned his BS from the Wharton School at the University of Pennsylvania and his PhD at the University of Pennsylvania. He lives with his wife and three children in the suburbs of Philadelphia.

About Moody's Analytics

Moody's Analytics provides financial intelligence and analytical tools supporting our clients' growth, efficiency and risk management objectives. The combination of our unparalleled expertise in risk, expansive information resources, and innovative application of technology helps today's business leaders confidently navigate an evolving marketplace. We are recognized for our industry-leading solutions, comprising research, data, software and professional services, assembled to deliver a seamless customer experience. Thousands of organizations worldwide have made us their trusted partner because of our uncompromising commitment to quality, client service, and integrity.

Concise and timely economic research by Moody's Analytics supports firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our economic research publications provide in-depth analysis of the global economy, including the U.S. and all of its state and metropolitan areas, all European countries and their subnational areas, Asia, and the Americas. We track and forecast economic growth and cover specialized topics such as labor markets, housing, consumer spending and credit, output and income, mortgage activity, demographics, central bank behavior, and prices. We also provide real-time monitoring of macroeconomic indicators and analysis on timely topics such as monetary policy and sovereign risk. Our clients include multinational corporations, governments at all levels, central banks, financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). Further information is available at www.moodyanalytics.com.

DISCLAIMER: Moody's Analytics, a unit of Moody's Corporation, provides economic analysis, credit risk data and insight, as well as risk management solutions. Research authored by Moody's Analytics does not reflect the opinions of Moody's Investors Service, the credit rating agency. To avoid confusion, please use the full company name "Moody's Analytics", when citing views from Moody's Analytics.

About Moody's Corporation

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). MCO reported revenue of \$4.4 billion in 2018, employs approximately 13,100 people worldwide and maintains a presence in 42 countries. Further information about Moody's Analytics is available at www.moodyanalytics.com.

© 2019 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657 AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.